



## Clear, Cool Streams in American Samoa

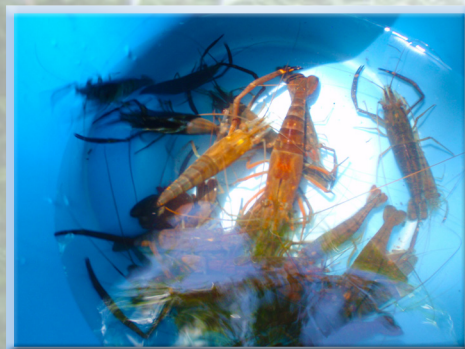
Sampling stream fauna is an exciting part of Inventory & Monitoring (I&M) Program work in the National Park of American Samoa (NPSA). The soothing sound of clear, cool water and the welcomed shade of overhanging trees makes a walk in or along a stream, a stress reducing experience. But a more compelling reason for studying these animals is that they are important to the riparian (stream) ecosystem.

Snails, or *sisi vai*, keep algae growth under control. They feed by scraping the algal film from rocks and other surfaces using a ribbon of teeth. The size, shape, texture, and color of their shells are important features for identification. Snail eggs are attached to submerged rocks or other hard surfaces in streams, or even attached to the shells of other snails. Although only a millimeter or two in size, the eggs are easily seen as clusters of white ovals or sesame-seed shapes against the dark rocks. Species such as *Clithon corona*, *Septaria suffreni*, *Septaria sanguisuga*, *Neritina canalis*, and *Melaniodes tuberculata* are found throughout Samoan streams. Snails are hand collected and released during the annual surveys.

Shrimp, *ula vai*, filter organic debris from flowing water and hunt insect larvae hiding among small stones. They are the most abundant mid-sized animals in Samoan streams. Most are only a few centimeters long and are well camouflaged. Others, belonging to the genus *Macrobrachium*, or "large arm", are easier to spot because of their larger size and bold behavior. Shrimp are an important food source for fishes,



The field crew works together to catch stream shrimp.



Shrimp are counted, identified, and released back to the stream.



The field crew meticulously identifies a shrimp.



A hermit crab decides to take some notes of its own.

birds, and people. During surveys, shrimp are caught with nets. Species such as *Atyoida pilipes*, *Caridina weberi*, *Macrobrachium lar*, and *Macrobrachium latimanus* are found during stream surveys.

Fishes, or *i'a vai*, are important food for large birds. People catch them for food and sport as well. Fish are not collected during surveys but they are identified and recorded when seen.

Stream animals are important indicators of the quality of the water. Healthy streams naturally have a balanced mix of native animals. During stream animal surveys, the water quality itself is also analyzed to ensure that streams remain healthy.

The I&M Program currently monitors three streams on Tutuila Island. Monitoring Fagatuitui Stream requires a long hike which is twice as hard on the way back. In contrast, Leafu and Amalau Streams only require a simple stroll from nearby villages. In the past, the I&M Program also sampled Laufuti stream on Ta'u Island, which is less influenced by humans than the Tutuila Island streams.

NPSA's freshwater animals are fascinating to study. Sharing this experience with others makes it even more enjoyable.

—V. Vaivai, NPS  
Biological Technician

## Native *Tuna* in the Streams ?

*Tuna* (in Samoan), is also known as the giant mottled eel, or the marbled eel (*Anguilla marmorata*).

**Description:** This freshwater eel has the widest distribution of the *anguillid* eels. It can be found in the tropical Indo-Pacific region from East Africa to French Polynesia as well as rivers in Japan and Mozambique. Adults are long and slender and have brown to black marbling on their backs over a greyish yellow base, and a white belly. They can reach lengths of 2 meters weighing a robust 20 kilograms, though they typically measure around 80 cm in American Samoa streams. This species is extremely long-lived with age estimates up to 40 years.

**Habitat and Diet:** Don't be alarmed if you see an eel slithering your way. *Tuna* are capable of limited overland travel, especially during rainy periods which keep their skin moist out of water. They can be found in all areas of the stream from the mouth to the headwaters. They are primarily nocturnal and eat a wide range of prey including crabs, fish, and frogs.



Occasionally, a giant mottled eel will move about on land for a short time in search of food.

**Reproduction:** *Tuna* spend their adult lives in freshwater or estuaries, but migrate to the ocean to reproduce. Their leaf-shaped larvae drift into the ocean and hide among plankton for about 4 months before returning to streams. Young migrate upstream feeding and growing for 8-20 years before returning to the sea to reproduce.



The field crew carefully removes an eel from a shrimp net during a survey.

**Threats:** Eels, like all freshwater fish, are cold-blooded and breathe using gills. Since they cannot regulate body temperature, their bodies are the same temperature as the water. Temperature affects the eels' metabolism and the amount of oxygen in the stream. In undeveloped areas with abundant tree cover, the water temperature remains relatively constant; therefore, the animal's metabolism and amount of oxygen in the water will also be relatively constant. However, in more developed areas where land has been cleared for housing or agriculture, the water is more exposed to the sun and temperature fluctuations during the day. The warmer water increases the eels' metabolism making them hungrier. The relative warmth simultaneously decreases the

amount of oxygen in the water, which makes it more difficult for *tuna* to breathe.

Additionally, pollution such as sewage or agricultural runoff from surrounding development further depletes oxygen levels in the water. Since these animals need to access the ocean as part of their life cycle, they may need to travel through more open areas as part of their journey to or from the ocean. If the amount of dissolved oxygen in the water is low due to lack of shade or elevated pollution, the animals' progress may be deterred.

The Inventory & Monitoring Program monitors animal populations annually, and water quality parameters quarterly. Monitoring includes vital measurements such as temperature and dissolved oxygen.

### Giant Mottled Eels in PACN National Parks:

The giant mottled eel is common in streams on Tutuila and Ta'u Islands in the National Park of American Samoa. This species is also found in Asan Stream on the island of Guam in War in the Pacific National Historical Park.

—A. Farahi, NPS  
Biological Technician

**Caught on Video:** We captured this *tuna* on video last time the stream crew was working in American Samoa. [www.youtube.com/watch?v=znXY0WEvvu0](http://www.youtube.com/watch?v=znXY0WEvvu0)